

THE HUMAN GENOME

New opportunities in the genomic era

Ten years on from the publication of the draft human genome, *Naturejobs* takes a look at promising areas of job growth in bioinformatics, DNA sequencing and genomic medicine.

"We've crossed a threshold. Now the challenge is handling the amount of information that can be generated."

Eric Green, director of the National Human Genome Research Institute

IN NOVEMBER 2010, more than 6,000 scientists and clinicians gathered at the Walter E. Washington Convention Center in Washington DC for the 60th annual meeting of the American Society of Human Genetics (ASHG). This was a record attendance, and of the wide variety of break-out sessions one topic drew a particularly large crowd. "The only room that was overflowing—and it had seating for 770—was one of the statistical genetics sessions that focused on databases," explains ASHG executive vice president Joann Boughman.

The session's popularity illustrates one of the key challenges—and opportunities—of the genomic era: what to do with the vast amount of data being generated by DNA sequencing. "When you start thinking about storing 3 billion base pairs of data from a million people, and then trying to figure out what that might mean, it becomes staggering," says Boughman.

Genomics is big business. A recent report by investment bankers Cowen and Company estimates that the gene sequencing market will grow to \$1.5 billion by 2015, up from \$600 million in 2009. This growth is being fuelled by improvements in speed and cost, making these technologies accessible to more researchers: sequencing a human genome can now be done in a week, according to some estimates, and costs less than \$40,000—and will certainly become quicker and cheaper.

In the ten years since the publication of the first draft of the human genome, genomics has established itself as a powerful tool in biomedical research. Many predict the next decade will bring several more developments, including a bioinformatics boom and long-awaited changes in how clinical medicine is practiced, especially oncology.

Burgeoning bioinformatics

Genomic data are everywhere. The per-base cost of DNA sequencing is now around 100,000 times cheaper than it was a decade ago, and the current generation of sequencing machines can read around 250 billion bases each week. As the US National Human Genome Research Institute (NHGRI) points out in this issue of *Nature* (see Perspective in the Research section), sequencing DNA is no longer the bottleneck

it once was in genomics. "We've crossed a threshold," says NHGRI director Eric Green. "Now the challenge is handling the amount of information that can be generated."

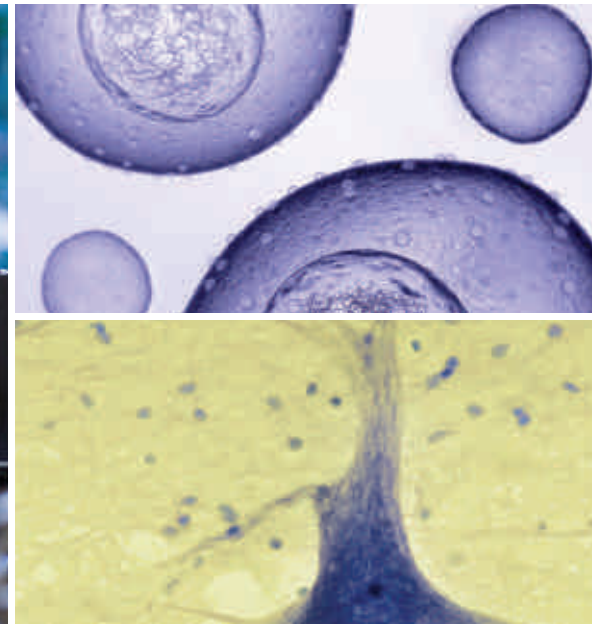
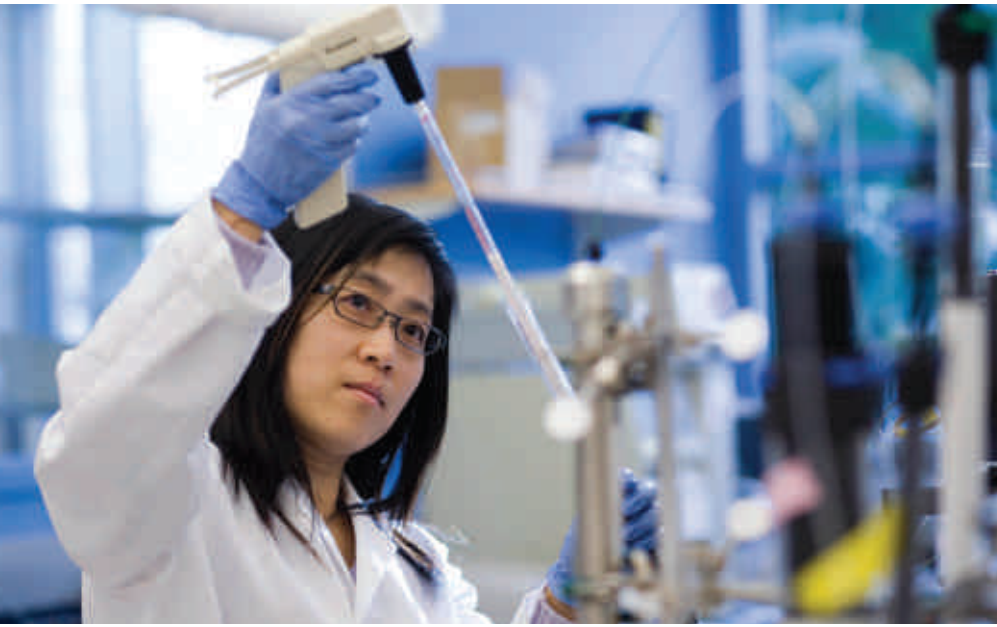
Tackling the challenges posed by the increasing volume of genomic data has helped bioinformatics to mature. "It's truly becoming recognized as a discipline in and of itself," says Harold Garner, director of the Virginia Bioinformatics Institute (VBI) in the United States, which provides bioinformatics services and training as well as conducting research. Garner says that many bioinformaticians are moving from a support role to directly making observations and discoveries. But while demand for bioinformaticians is growing, supply is not keeping up. A recent *Nature* survey of around 1,100 life scientists found that scarcity of bioinformatic expertise is one of the main obstacles to making full use of sequencing data (see go.nature.com/ss9FI3). Fortunately there are indications that this is being addressed. Plans are in place to double the size of the VBI over the next ten years to 500 staff, and funding remains strong despite the uncertain economic outlook. In the United Kingdom, the European Molecular Biology Laboratory's European Bioinformatics Institute (EBI), located next to the Wellcome Trust Sanger Institute in Cambridge, is also helping to plug the skills gap by providing a wide range of bioinformatics training for researchers plus postgraduate degrees in bioinformatics. "In 2004 we ran 20 formal training courses, and in 2009 we ran well over 150," says EBI director Janet Thornton. The courses are usually over-subscribed, and the EBI expects to run more in 2011. »

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The European Molecular Biology Laboratory's European Bioinformatics Institute is a leader in the bioinformatics revolution.

» As well as being in greater demand, the role of the bioinformatician is also becoming more diverse. "You have to be a bit of a jack-of-all-trades," says Thornton. "You're dealing with huge amounts of data, and

you also need to have a pretty good knowledge of the broader biology." As more information is gleaned from the human genome, there will be a growing need for bioinformaticians who understand how the basic genetic data can help

improve medical diagnosis and treatment. And away from the lab or clinic, there are opportunities for other bioinformaticians to publish original research by mining existing data. "[They] can take advantage of the tremendous amount of data amassing out there," says Garner. "It's so vast that nobody is really going through and analysing it with complete thoroughness."

Sequencing: the next generation

When the current generation of state-of-the-art DNA sequencers first emerged in 2005, scientists and technicians accustomed to working with first-generation capillary sequencers had to change their approach to research. Targeting sections of the genome has been replaced with "let's just sequence the whole thing and figure out what's going on," says Garner, adding that many technicians are now being asked to do much more data analysis. This is the case at the main gene sequencing facility at the

Pasteur Institute in Paris, known as the Genopole. The facility had a next-generation Illumina sequencer installed in 2008 and upgraded in 2010, presenting new opportunities for the facility's two technicians. "They have a lot of interesting projects," explains Genopole head Philippe Glaser. "They are both doing the sequencing, but they also contribute to the analysis." Demand for the machine is high, and Glaser is looking at ways to increase capacity without taking on more technicians. "Some groups that are asking for a lot of sequences will construct the [DNA] libraries themselves," Glaser explains. He estimates that freeing technicians from this preparatory step should double productivity at the Genopole.

Other labs have taken different approaches. The Centre for Genomic Regulation (CRG) in Barcelona, Spain, began using second-generation sequencers in mid-2008. "We have seen quite a dramatic increase in the



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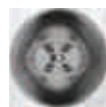


The Birthplace of Genomics

King's College London takes great pride in its association with the field of genomics, beginning with the elucidation of the three-dimensional helical structure of DNA by **Rosalind Franklin** and **Maurice Wilkins** in the 1950s here in the heart of London. The culmination of this discovery was the publication of the **human genome** in 2001, which led to an explosion of interest in genomic research. In the decade since techniques such as **transcriptional profiling** and **high-throughput sequencing** have been taken into the clinic as sources of important diagnostic information. Indeed, application of the power and potential of the genome for **translational research** is a major focus at King's College London with the foundation of the **NIHR Biomedical Research Centre**.

The King's College London Genomics Centre and the **Biomedical Research Centre's Genomics Core Facility** are designed to ask and answer extremely detailed questions about our genomes, using **DNA Microarray** technology and **Next-Generation Sequencing**. The Genomics Centre was opened in 2003 by **Professor Raymond Gosling** who worked closely with Franklin and Wilkins, to mark the 50th anniversary of the Nature publications on the structure of DNA, and is located at the Franklin-Wilkins Building, Waterloo. The Biomedical Research Centre's Genomics Core Facility is located on the Guy's Hospital campus at London Bridge.

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If you would like to know more about our Centres and what we do, and how we can help you, please contact:

Dr Matthew Arno, Genomics Centre Manager

email matthew.arno@kcl.ac.uk

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For the Biomedical Research Centre contact genomics@genetics.kcl.ac.uk.

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use of these instruments,” says Heinz Himmelbauer, head of the sequencing unit at the CRG, who has overseen an increase in the number of technicians from two to five.

Moving from end-user to manufacturer, the sequencing industry itself is also providing new opportunities. Illumina, a leading manufacturer of high-speed sequencing technology, was founded in 1998 with just seven personnel. It now employs more than 2,000 people worldwide, and it is planning to hire a further 500 staff in 2011. Chief technology officer Mostafa Ronaghi says that while there will be new jobs in R&D, the majority of the company’s expansion will be on the commercial side, such as in sales and marketing—and scientific skills are a major asset in these positions. “The majority of people in our sales department have a PhD and have done a postdoc,” explains Ronaghi. “These are technical sales, and they really need to understand the technology and the competitive

landscape in order to address the needs of the customer.”

Not all scientists have access to these advanced machines; some researchers still use capillary sequencers. As a low-cost, high-throughput alternative for these researchers, Illumina will be launching a compact sequencer, the MiSeq, later this year. The company says the MiSeq will be able to analyse data from purified DNA in as little as eight hours. Ronaghi adds that the company is planning to take this concept further, increasing the throughput to drive the cost-per-base down to a level where insurance companies would be willing to pay for full genome sequencing as part of treatment. “For wider use in the clinic we need to drop the cost below \$1000 per genome,” he says.

The \$1000 genome is a major target for both industry and academia. In September 2010 the NHGRI awarded more than \$18 million in grants to ten teams of researchers to help spur the development of a third generation

of higher speed, lower cost sequencing technologies. The largest grant will support research into single-molecule DNA sequencing using engineered nanopores. This approach, which removes the need for DNA amplification and labelling, is also being developed into a viable technology by Oxford University spin-out company Oxford Nanopore Technologies. The company’s chief executive, Gordon Sanghera, says working on the next generation of sequencers requires a certain mindset. “You need people who are prepared to raise their head above their discipline parapet and get a broader view,” he says. The nature of the development pipeline also means that scientists and engineers must combine this creative thinking with a willingness to carry out less glamorous but equally important tasks. “There are moments of brilliance followed by lots and lots of bench science,” Sanghera explains.

These people are hard to find, and Oxford Nanopore works hard to attract top talent. It counts 19 nationalities among its 90 staff, and has a relatively flat management structure with merit-based remuneration to foster innovation. Sanghera says the effort is worth it: “When you get those people, you get this great confluence of ideas. They push that innovation to the next level.”

From bench to bedside

Many experts are predicting that the next decade will see a large-scale expansion of genomic medicine, with a range of associated career opportunities. “The medicine of the future will be data-rich and individualized,” says Hans Lehrach at the Max Planck Institute for Molecular Genetics. There is particular promise in oncology, where sequencing the genomes of both healthy and cancerous tissue could soon become routine practice. “This is not something that is going to happen a few decades from now,” says Lehrach. “It’s what we’re trying to do now.” Researchers are also looking beyond the genome itself to associated concepts such as the microbiome, which is a genetic catalogue of the microbial species that inhabit a defined environment such as the human body. “We have more microbial cells than human cells,” says Karen

Nelson, director of the Rockville, Maryland campus of the J. Craig Venter Institute (JCVI), one of four sequencing centres taking part in the Human Microbiome Project. These microbes, she continues, “contribute significantly to our health, disease and development”.

The fast pace of discovery poses several challenges that must be overcome before the potential of genomic medicine can be fully realized. “Clinicians and researchers need to have more of a dialogue,” says Nelson. Boughman agrees there is a knowledge gap, saying that although medical schools are doing a good job of teaching genetics and how it fits into the practice of medicine to the current trainees, there is a huge number of physicians who have been in practice for a long time who need to be brought up to date. This need to make primary care doctors aware of the latest research is leading to a growth in the number of geneticist educators, and there are also calls for an increase in the number of genetic counsellors for patients.

A bright future

NHGRI’s Green is confident that scientists who combine experience in biology or medicine with another discipline such as informatics, computer science or mathematics have a bright future in genomics. He also sees a need for people who are “multilingual” in genomics and areas such as policy, political science, ethics or law. “The perfusion of genomics into so many areas of science, clinical medicine and society means that we need people who are trained in more than one area,” he says. But he calls for more research to ensure funding is used most effectively in today’s challenging financial climate.

Those in the vanguard of genomics also emphasize the need for scientists interested in the field to develop a deeper appreciation of its potential for improving healthcare. Boughman says she is always surprised at the large number of molecular scientists or biochemists who had never met a patient with the disorder they were studying. “To really figure this out,” she says, “we are going to need to have all the pieces of the puzzle”. *Nature editorial staff have no responsibility for content*



The National Genome Research Network (NGFN) is the largest program of disease-oriented human genome science in Germany. Launched 2001 by the German Federal Ministry of Education and Research (BMBF), the NGFN celebrates its 10th anniversary this year.

While the German Human Genome Project (DHGP, 1995 to 2004) contributed to the decoding of the human genome especially by sequencing of chromosomes 7, 8, 11, 21, and X, the NGFN builds on these previous successes and aims to transfer genome research findings into medical application by focusing on disease areas of high socioeconomic importance. Research fields are cardiovascular and metabolic diseases, cancer, neurological disorders, infection and inflammation as well as diseases caused by environmental factors.

Until 2010, the output of NGFN has included more than 3,500 scientific publications with over 250 in the top 10 scientific journals, and 100 patent applications. Identification of disease-related genes and their mechanisms, generation of gene signatures to be employed in prediction and therapy as well as the provision of diagnostic tools are important achievements of NGFN.

Hundreds of scientists at 60 renowned research institutions all over Germany synergize in cutting-edge interdisciplinary projects and collaborate with more than 600 research groups worldwide. NGFN is a vital part of international projects as the “1000 Genomes Project” and the “International Cancer Genome Project”.

For further information please visit www.ngfn.de

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PROGRAM OF
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John A. Hannah Distinguished Professor Faculty Position in the Molecular Metabolism and Disease Program Michigan State University

Applications are invited for an endowed John A. Hannah Chair position in the Molecular Metabolism and Disease Program at Michigan State University. This position is tenured at the level of Full Professor. We seek an outstanding investigator with a strong externally funded research program directed towards understanding the pathobiology of metabolic disease processes with emphasis on diabetes, obesity and inflammation. The ideal candidate will have expertise in the area of neuroendocrine function, gene regulation, stem cell biology and/or translational research. The selected candidate is expected to interact with and contribute to the leadership of a growing group of strong investigators in this area (<http://molecularmetabolism.msu.edu/faculty.html>). The primary faculty appointment will be in one of the basic science departments including Biochemistry and Molecular Biology, Microbiology and Molecular Genetics, Physiology, or Pharmacology and Toxicology. Molecular Metabolism and Disease is a targeted area of future investment at MSU, including new hires and infrastructure development. This position comes with significant operating funds provided annually for program support and generous laboratory space. In addition, the applicant will have access to MSU's broad range of core facilities (https://www.msu.edu/~vprgs/analytical_core_facilities.htm) and rich multi- interdisciplinary environment. Interested individuals should provide an electronic (PDF) document that includes curriculum vitae, statement of research interests, contact information for five references, and copies of relevant publications to: Pam Fraker, Ph.D., Director, Molecular Metabolism Disease Program (MMDHannah@cns.msu.edu). Review of applications will begin March 2011 and continue until the position is filled.

Michigan State University is an Equal Opportunity/Affirmative Action institution. Minorities, women, veterans and persons with disabilities are encouraged to apply.

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Faculty Positions Department of Neuroscience

Scripps Florida is seeking outstanding applicants for tenure track faculty positions in the Department of Neuroscience at its newly opened, state-of-the-art campus in Jupiter, Florida. The Jupiter campus of the Scripps Research Institute offers a rapidly growing, dynamic environment and is committed to providing a multi-disciplinary, collaborative atmosphere for cutting edge neuroscience research. We invite applications from ambitious and interactive investigators applying integrative molecular, genetic, biochemical, biophysical, cellular (iPSC), anatomical, and behavioral approaches to elucidate the mechanisms underlying nervous system function. In addition to basic neuroscience, we have a keen interest in human neurological and psychiatric disorders and/or animal models for these disorders. Particular areas of interest include learning and memory, sleep research, synapse formation and physiology, and drug discovery for CNS disorders. The state-of-the-art facilities at Scripps Florida house expertise in proteomics, crystallography, pharmacokinetics, medicinal chemistry, rodent behavior, and ultra high-throughput small molecule screening for drug discovery.

Appointments are available at Assistant, Associate, or Full Professor. Scripps Florida offers exceptional startup packages and an outstanding intellectual environment for fostering top-tier basic and translational research. Further information about our expanding Department of Neuroscience can be found at <http://www.scripps.edu/florida/neuro/>. Interested candidates should submit their *Curriculum Vitae*, a synopsis of their past, current, and proposed research, and complete contact information for at least three professional references as a single PDF file, to:

Dr. Ronald L. Davis, Chairman, Department of Neuroscience
c/o Hollie Alkema
(hollie@scripps.edu)

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J. Craig Venter Institute Faculty Positions

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JCVI is seeking qualified applicants for positions at all levels at our La Jolla, California and Rockville, MD facilities particularly in the following research focus areas:

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Successful candidates will conduct innovative, independent research, obtain extramural funding, take advantage of interactions with our interdisciplinary, highly collegial group of scientists within JCVI, and complement existing strengths within the organization. Candidates must have a Ph.D. or M.D. and a record of accomplishment in one or more of the targeted areas. The level of appointment will be commensurate with experience.

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RESEARCH CHAIR RATIONAL DRUG DESIGN

The College of Pharmacy and Nutrition, University of Saskatchewan, invites applications for a **Chair in Rational Drug Design**, to begin July 1, 2011. The Chair will be a nationally recognized and distinguished scholar with documented success in conducting research in the area of drug design, which may include expertise in structural biology and/or computational methods. The Chair will be appointed to a tenure track position, and will contribute to the academic programs of the College through research, graduate training and teaching. S/he will facilitate opportunities for exchange of ideas and team research on the intricacies of drug design within our University as well as with scholars from other institutions and partners in industry. The successful candidate will lead a talented group of scientists in the *Drug Design and Discovery Group*, located in the College. The mandate of this Group is to conduct fundamental research on drug discovery, drug delivery, pharmacokinetics and metabolism. The Chair will also work with researchers from across campus, notably at the *Canadian Light Source* synchrotron and in the *Molecular Design Research Group*, in cutting-edge research, and will be expected to attract and maintain substantial research funding from various granting agencies. Applications will be accepted until **March 15, 2011** or until the position is filled. Please submit curriculum vita, research interests and experience, and the names of three referees, preferably electronically, to:
Dr. Dennis Gorecki (dennis.gorecki@usask.ca)
Selection Committee Chair, College of Pharmacy and Nutrition, University of Saskatchewan, 110 Science Place, Saskatoon SK S7N 5C9 CANADA (www.usask.ca/pharmacy-nutrition/news/read.php?id=204)

NW208880R



Postdoctoral Fellow in
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Department of Biochemistry
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Saint Louis University
School of Medicine

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Molecular and Cellular Biologist

Molecular and Cellular Oncology

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Interested applicants should send a letter and curriculum vitae to:
Mien-Chie Hung, PhD, Chair, Department of Molecular and Cellular Oncology, Unit 108, The University of Texas MD Anderson Cancer Center, 1515 Holcombe Blvd., Houston, Texas 77030; Email: nedwards@mdanderson.org.

THE UNIVERSITY OF TEXAS

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ERIBA

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With over 25,000 students, Groningen offers a vibrant academic community in a classic small town setting of 200,000 inhabitants.

Studies in ERIBA will be focused on mechanisms of ageing using state-of-the-art-equipment and infrastructure including flow cytometry, live cell imaging, DNA sequencing, mass spectrometry and bioinformatics. The goal of studies within ERIBA is the discovery of novel mechanisms explaining the loss of cells and the functional decline in cells and tissues with age and the integration of various mechanisms of ageing that have been proposed. The latter include (but are not limited to): changes in mitochondrial function and metabolism; deregulation of cell cycle checkpoints and defective DNA repair; telomere attrition and loss of genome integrity; aberrant gene expression; loss of organelle function and defects in protein production or function.

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More information

For more information about these vacancies you may contact:
Prof. Peter Lansdorp, Scientific Director, ERIBA;
email p.lansdorp@med.umcg.nl
or Prof. Gerald de Haan, Scientific co-Director, ERIBA;
email g.de.haan@med.umcg.nl

Information about ERIBA:

<http://www.umcg.nl/EN/Research/HealthyAgeing/ERIBA>

Information about Groningen:

<http://portal.groningen.nl/en>

How to apply

Full applications including a resume, statements of research and teaching interest, 2-3 selected publications (together with short paragraphs highlighting your specific contribution in those papers) and the names of three references will receive full consideration if received before June 1, 2011.

To apply please visit our website:

[http://www.umcg.nl/EN/corporate/careers/Vacancies→medical/scientific staff](http://www.umcg.nl/EN/corporate/careers/Vacancies→medical/scientific%20staff)

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The **European Bioinformatics Institute (EBI)**, part of the European Molecular Biology Laboratory (EMBL), is the leading **centre of excellence** for bioinformatics in Europe.

Located on the Wellcome Trust Genome Campus close to Cambridge, UK, EMBL-EBI promotes **progress** in the life sciences by: providing freely available data and services, fostering basic research, providing training and disseminating cutting-edge technologies to industry.

Bioinformatics is a **multidisciplinary field** that is constantly evolving. Working in an **international** environment, EMBL-EBI staff share their expertise in many areas of science, technology, communications and administration.

Basic research ensures that we can grow with our resources and helps us anticipate the effects of emerging technologies. Working in close **collaboration** with our colleagues throughout EMBL, we foster the pursuit of ambitious, high-level, long-term research projects.

Our faculty have the freedom to set their own **scientific directions** and are encouraged to explore the most challenging research areas of their interest.

Our users are at the centre of everything we do, so we count on our staff of trainers, interface developers, industry liaison officers and usability analysts to help guide our work.

With a staff of close to 500, we depend on our administrators to provide **support** in grant management, finance, event organisation and many other areas. Importantly, all our staff can benefit from EMBL's **career development** training programme.



W209551R



Senior Research Fellow/Reader in Quantitative Genetics

£36,715 - £52,347

We are seeking scientists with established or developing reputations in quantitative biology. You will initiate and lead a research programme of international quality in the area of Quantitative Biology / Quantitative Genetics / Quantomics that will contribute to The Roslin Institute's research strategy and in the context of the Institute Strategic Programme Grant on "Analysis and Prediction in Complex Animal Systems".

Exemplar areas of research include:

- reverse engineering of regulatory networks
- predictive modelling (from sequence to consequence)
- quantitative genetics
- evolution and selection of population attributes

The Roslin Institute is a BBSRC Institute associated with the Royal (Dick) School of Veterinary Studies, the number one-ranked Veterinary School in the UK in the 2008 Research Assessment Exercise. The Institute undertakes research within the framework of BBSRC Institute Strategic Programmes focussed on the health and welfare of animals, and applications of basic animal sciences in human and veterinary medicine, the livestock industry and food security. Roslin is a member of the Easter Bush Research Consortium (EBRC).

Appointment will be at Senior Research Fellow/Senior Lecturer/Reader (UE9: annual salary of £46,278 to £52,347 for 35 hours each week) or Career-Track Fellowship (UE8: annual salary of £36,715 to £43,840 for 35 hours each week) level depending upon experience. Start up packages and a core-funded support post may be available.

Informal enquiries to Professor Alan Archibald, Division of Genetics and Genomics (email: alan.archibald@roslin.ed.ac.uk)

Ref: 3010637. Closing date: 30 June 2011.

For further particulars and an application pack visit our website www.jobs.ed.ac.uk or telephone the recruitment line on 0131 650 2511.

U209516R

The 10th Annual Pharmacogenetics in Psychiatry Meeting

April 15-16, 2011

New York Marriott Hotel Downtown

New York, NY



The 10th Annual Pharmacogenetics in Psychiatry meeting will include sessions presenting the latest pharmacogenetics data from around the world. Topics to be discussed include: prediction of clinical response to antipsychotic and antidepressant drugs; genes associated with the development of adverse side effects; novel statistical approaches; and the implication of genome-wide association (GWAS) approaches for pharmacogenetics.

A limited number of travel awards for young investigators will be available to support conference attendance. To apply for an award, please submit a CV and one letter of reference with your meeting abstract.

www.pharmacogeneticsinpsychiatry.com

NW208551EL



Oxford BioTherapeutics (OBT) is a world leader in oncology mAb discovery. OBT discovers novel oncology drug targets using its proprietary proteomics discovery platform OGAP® and, through its alliances with world leaders in antibody development, has built a broad preclinical pipeline of first-in-class cancer drug programs that are advancing rapidly into clinical development. OBT is expanding its global operations as a result of a growing interest in its capabilities and is actively recruiting for the following positions:

Based near Abingdon, Oxfordshire, UK...

Biochemist: The successful candidate will be responsible for various activities in the discovery and characterisation of targets for utility as cancer therapeutics and diagnostics. Applicants should hold a first degree in biological sciences. Skills in proteomics, mass spectrometry, immunochemistry and general molecular biology would be an advantage.

Business Development Assistant: Working in a small dynamic team, you will work closely in supporting OBT's external collaborations across its global network of alliances. No prior experience of business development or life science is required, but applicants must have an exceptional academic record, be highly ambitious, motivated and enjoy being challenged.

Scientific Writer: As part of the target discovery team, you will work on OBT's growing portfolio of oncology therapeutic targets to prepare scientific presentations, reports, data packages, patent applications and other documents. Candidates must have a strong first degree in science. Experience in scientific/technical writing would be an advantage.

Data Manager: Working in the in silico discovery group you will be involved with processing and analysis of data generated in our target discovery pipeline. The role will involve data entry along with validation and QC of data. Knowledge of SQL and databases is essential, with experience in system development and biological data management an advantage.

QA Auditor: OBT is seeking candidates with at least 2 years relevant Quality Assurance experience to assist with the running of the company's Quality Management System in support of the project, technical and scientific teams. Activities will include administration, control of key documentation and auditing of critical activities.

Based near San Jose, California, USA...

Project Manager: OBT is seeking an experienced project manager to oversee its growing preclinical operations and its collaborations with California-based companies. A demonstrable record in successful project management in a biotech company is a must. Candidates should be highly organised and have excellent communication skills.

Cell Biologists: Candidates will have experience working with cancer cell lines in vitro and in vivo including cell growth and antibody centric cell based assays such as ADCC, proliferation, invasion and FACS. This experience should have been gained during more than 2 years working in a dynamic biotech environment.

Antibody Specialists: As part of OBT's preclinical antibody group, you will conduct sequencing, cloning, expression and purification of antibodies and antibody fragments. Candidates should have more than 3 years experience in these areas and be fully aware and skilled in processes spanning the whole repertoire of antibody cloning and expression.

Target Validation Scientists: With experience in many areas of target assessment in oncology and skills in cell biology, molecular biology, immunohistochemistry and bioinformatics, successful candidates will adopt OBT's orthogonal approach to target validation for oncology and play a crucial role in the prioritization of new antibody drug targets in oncology.

OBT is a dynamic and rapidly growing company looking for team players with ambition, initiative, excellent communication skills, the ability to prioritize and the desire to develop and apply their skills to the discovery of new therapeutic targets and antibody drugs for cancer. We offer a competitive remuneration package, including private healthcare.

For further information please see www.oxbt.co.uk/aboutus_careers.php or send your CV to careers@oxbt.co.uk indicating the role(s) you are applying for.

U209534R

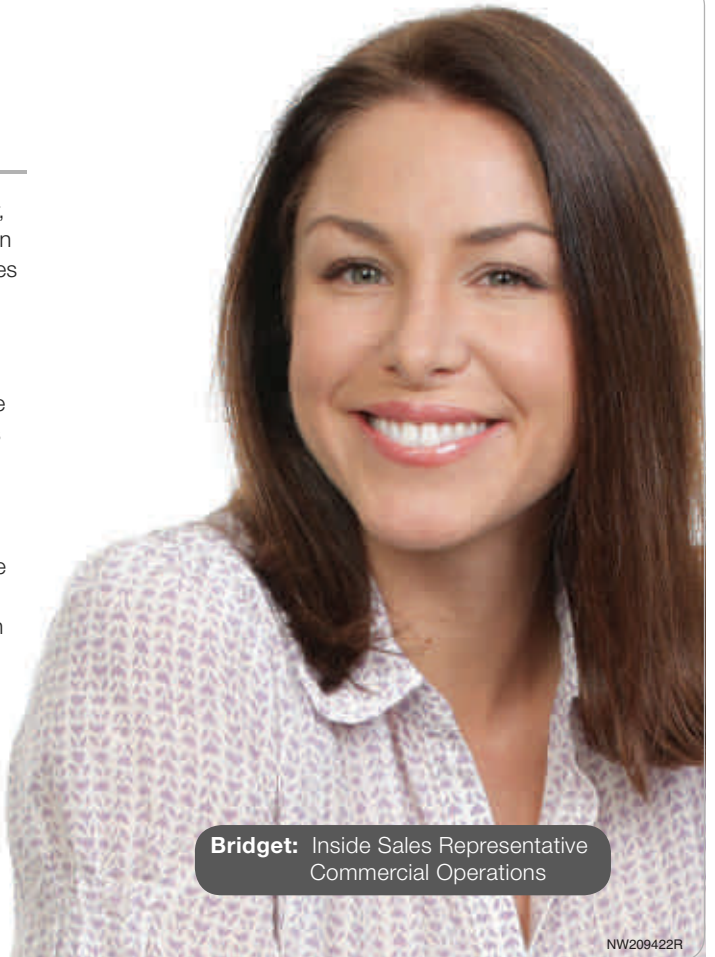
youⁱ

Why is one person more likely to develop a disease—like cancer, diabetes or Parkinson's—than someone else? Why would one person respond differently to treatment than another? Illumina's technologies are helping researchers around the world answer these questions and others, on a scale not even possible a few years ago.

Illumina is the only life sciences company developing genome-wide technologies for genotyping, gene expression and sequencing—the three cornerstones of modern genetic analysis. By enabling studies of thousands of patient samples at once, our products set genetic discovery on fast forward. And we're just getting started.

When you join the high-performing team at Illumina, your work takes on new meaning—to an exponential degree. Our growth, our positive culture, and the impact our products are having in the world ignite a passion that drives our people forward. And together, we accomplish beyond expectations.

experience the power of **i**
illumina.com/careers



Bridget: Inside Sales Representative
Commercial Operations

NW209422R



CEDARS-SINAI MEDICAL CENTER



Endowed Chair in Medical Genetics

We are seeking an established, funded investigator in medical molecular genetics/ genomics to occupy an endowed chair in the Medical Genetics Institute at Cedars-Sinai Medical Center. The Medical Genetics Institute (MGI) provides comprehensive clinical care and carries out cutting edge research in Medical and Human Genetics. The MGI has a portfolio of active research that includes clinical genetics, dysmorphology, cancer genetics, common disease genetics, genetic epidemiology, genetic skeletal and connective tissue disorders, inborn errors of metabolism, immunogenetics, genomics, and treatment of genetic diseases and metabolic disorders.

The successful candidate will be an MD and/or PhD with an excellent track record in research, grantsmanship and peer reviewed publications who will establish their own research program using human or model organisms and biochemical, molecular and/or genomic approaches to study genetic diseases.

The MGI is comprised of twenty-two faculty members and institutionally shares core facility resources for cell culture, DNA sequence analysis, high throughput genotyping, expression confocal microscopy, flow cytometry, and a vivarium for small and large animals. Academic appointment will be made through the Cedars-Sinai professorial series and the David Geffen School of Medicine at the University of California Los Angeles or equivalent. Faculty expectations include active teaching, research and publication.

Cedars-Sinai Medical Center is a 952 bed tertiary care hospital with more than 400 faculty members, over 10,000 employees and a large private attending physician community. Numerous specialties are ranked in US News and World Report. We are located in a highly desirable location in the western part of Los Angeles. Competitive salary based on academic rank and experience, benefits and relocation support will be provided.

Qualified applicants should submit CV's to Dr. David Rimoin, c/o patricia.carson@cshs.org

Cedars-Sinai Encourages and Welcomes Diversity in the Workplace AA/EEO

NW209502R

DEPARTMENT OF HEALTH AND HUMAN SERVICES
NATIONAL INSTITUTES OF HEALTH
NATIONAL HUMAN GENOME RESEARCH INSTITUTE
DIVISION OF EXTRAMURAL RESEARCH
HEALTH SCIENTIST ADMINISTRATOR



The National Human Genome Research Institute (NHGRI), a major research component of the National Institutes of Health (NIH) and the Department of Health and Human Services (DHHS), has led the groundbreaking enterprise known as the Human Genome Project, and is now vigorously exploring the application of advances in genome research to human health. The NHGRI is inviting applicants to apply for a Federal position of Program Director in the Division of Extramural Research. The incumbent will serve as a senior Health Scientist Administrator managing a portfolio of extramural grants and contracts related to the development of the Trans - NIH Common Fund Project: Human Heredity and Health in Africa (H3Africa). The Program Director will have advanced scientific training, as evidenced by a Ph.D degree, or equivalent relevant research experience, with a particular expertise in cutting edge genomic technology as applied to the analysis of the genetic basis of human disease, or senior level experience in an appropriate related discipline or profession of biomedical research. It is desirable that the Program Director also have experience in conducting or managing research in Africa. The incumbent will maintain an active knowledge of advances in the fields of genomics, human genetics, bioinformatics and the application of such research to the advances of health and prevention of disease, particularly in Africa. Responsibilities will encompass scientific and programmatic management of a full range of grant and contract mechanisms; surveying, evaluating and integrating available knowledge in the areas of genome-related health research; and identifying research that might produce new knowledge. The NHGRI vacancy announcements for this position contain complete application procedures and list all mandatory information which must be submitted with your application. The vacancy announcements for this position will be available on <http://www.usajobs.gov> and posted under announcements for GS-14 as NIH-NHGRI-DE-11-434826 and NIH-NHGRI-MP-11-434895, and GS-15 as NIH-NHGRI-DE-11-434828 and NIH-NHGRI-MP-11-434901, from February 16, 2011 to March 2, 2011. You may also visit the NIH website at: www.jobs.nih.gov. Applications must be received no later than March 2, 2011.

Questions pertaining to scientific responsibilities and expertise can be referred to Dr. Jane Peterson at jane.peterson@nih.gov. This is a full time permanent position offering benefits including health and life insurance, retirement, sick and annual leave. U.S. citizenship is required.

DHHS and NIH are Equal Opportunity Employers.

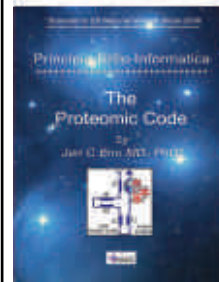
NW209561R



The HOMULUS FOUNDATION & Jan C Biro MD., PhD
wish to contribute to the development of a new scientific field related to the

PROTEOMIC CODE & Nucleic Acid Assisted Protein Folding.

We have: books, lectures, education, network, conferences, peer-reviewed journal, patent, grants and awards for qualified researchers and the Biotech. Industry.



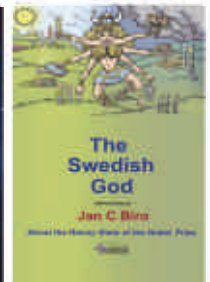
The Proteomic Code
Completing the Genetic Code

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Creative Ideas in Molecular Biology & Bioinformatics

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The Swedish God.
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FREE DOWNLOADS

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Social Networking and Publishing forums for Scientists and Biotech people who are interested for the protein-protein, protein-nucleic acid interactions.

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HOMULUS® AWARD - 20K\$ for the best article in the subject

Info: WWW.JANBIRO.COM Contact: JAN.BIRO@ATT.NET phone: +1 213 627 8134

NW209467A

Post doctoral fellowships in São Paulo, Brazil



The São Paulo Research Foundation, FAPESP, one of the main research funding agencies in Brazil, invites talented researchers with a recent PhD degree and a successful research track record to apply for postdoctoral fellowships. In 2010, 66 positions were opened and this year already 8 have come up, in virtually all fields of knowledge (see <http://www.oportunidades.fapesp.br/en/>)

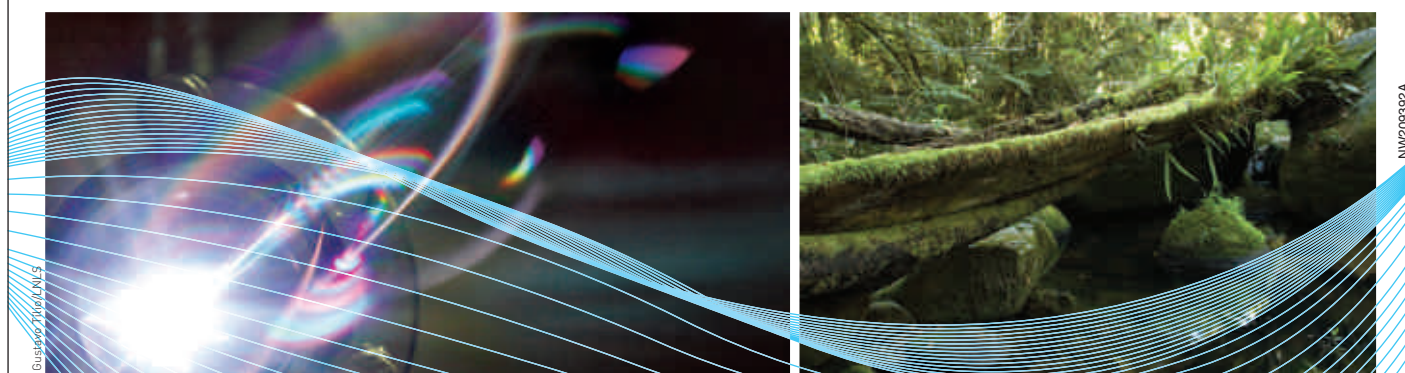
Fellowships may also be requested through specific proposals presented by a candidate and

a supervisor from any research group affiliated to higher education and research institutions in the state of São Paulo.

FAPESP's PD Fellowships are granted for 24 months and can be renewed for 12 months. It includes a monthly stipend, travel to and from Brazil expenses for the selected candidate and his family, and an overhead for small research expenses.

For additional information, see <http://www.fapesp.br/en/materia/5427/scholarships/post-doctorate-fellowship.htm>

For guidance write to pd@fapesp.br



Scripps Translational Science Institute

The Future of Genomic Medicine IV Conference Thursday March 3 and Friday March 4, 2011

Scripps Institution of Oceanography
Samuel H. Scripps Auditorium
La Jolla, California

Course Overview

The fourth Future of Genomic Medicine conference will focus on the extraordinary advances that are occurring in the field, which include whole genome and exome sequencing, new gene expression tests for routine medical practice, and consumer genomics. The 2011 conference will include in depth sessions on cancer genomics and diabetes, two areas in which there have been particularly remarkable progress. We will feature sessions on "views from the outside" with speakers who are journalists and public figures, not scientists. Our overarching goal is to spearhead efforts to change medicine using genomics.

Overall Course Educational Objectives:

- Demonstrate the unmet needs of medicine today with respect to more targeted, individualized prevention and treatments.
- Discuss the opportunities of the genome, proteome, metabolome discovery to change medical practice as it exists today.
- Assess how changes and advances in technology are rapidly ushering in a whole array of new pathways for individualized medicine of the future.
- Explore specific strategies in cancer, cardiovascular and pharmacogenomic futuristic interventions.

More information and a complete program can be found here: <http://bit.ly/h72b7b>

Eric J. Topol, MD, Course Director

Director, Scripps Translational Science Institute
Chief Academic Officer, Scripps Health
Professor of Translational Genomics, The Scripps Research Institute
The Gary and Mary West Chair of Innovative Medicine

Sarah S. Murray, PhD, Planning Committee

Director, Genetics
Scripps Translational Science Institute
Scripps Health and The Scripps Research Institute

Samuel Levy, PhD, Planning Committee

Director of Genomic Sciences
Scripps Translational Science Institute
Scripps Health and The Scripps Research Institute

Nicholas J. Schork, PhD, Planning Committee

Director of Research, Biostatistics and Bioinformatics, Scripps Genomic Medicine, Scripps Health
Professor, Department of Molecular and Experimental Medicine, The Scripps Research Institute

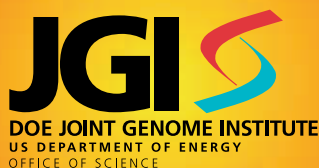
NW209407E

The 2011 Department of Energy
Joint Genome Institute
(DOE JGI)

sixth annual
**GENOMICS
OF ENERGY &
ENVIRONMENT
MEETING**



March 22-24
Walnut Creek, California



<http://go.usa.gov/1Vy>



topics include:

Synthetic Biology • Ecogenomics and Ecoresilience of the Gulf Oil Spill • Hardware and Software Trends in Genomics Supercomputing • Computational Approaches to Massive Short Read Metagenomic Data Sets • Genomics of Biofuel Crops • Behavioral Genetics of Pollinating Bees • Microbiome Analyses from Humans to Shipworms • Metatranscriptomics of Marine Microbial Communities • Successful Transposable Elements Secrets • Great Prairie Soil Metagenomics

confirmed speakers include:

- | | |
|--|---|
| <p>Peer Bork, European Molecular Biology Laboratory (EMBL)</p> <p>Ed Buckler, Cornell University</p> <p>Dan Distel, Ocean Genome Legacy</p> <p>Dusko Ehrlich, French National Institute for Agricultural Research (INRA)</p> <p>Terry Hazen, Lawrence Berkeley National Laboratory (LBNL)</p> <p>Scott Hodges, University of California, Santa Barbara</p> <p>Tom Juenger, University of Texas at Austin</p> <p>Rob Knight, University of Colorado</p> <p>Ruth Ley, Cornell University</p> <p>Mary Ann Moran, University of Georgia</p> <p>Magnus Nordborg, Gregor Mendel Institute</p> | <p>Gene Robinson, University of Illinois at Urbana-Champaign</p> <p>Christopher Scholin, Monterey Bay Aquarium Research Institute (MBARI)</p> <p>Stephan Schuster, Penn State University</p> <p>Pam Silver, Harvard</p> <p>Jim Tiedje, Michigan State University</p> <p>Mike Thomashow, Michigan State University</p> <p>Jerry Tuskan, Oak Ridge National Laboratory/DOE JGI</p> <p>Sue Wessler, University of California, Riverside</p> <p>Katherine Yelick, National Energy Research Scientific Computing Center (NERSC) at LBNL</p> |
|--|---|

workshops include:

Integrated Microbial Genomes (IMG)/Metagenomes data analysis systems <http://img.jgi.doe.gov/>

Mycocosm fungal genomics portal provides data access, visualization, and analysis tools for comparative genomics of fungi <http://genome.jgi-psf.org/programs/fungi/index.jsf>

Phytozome provides data access and visualization tools for comparative plant genomics <http://www.phytozome.net/>

RNA Technologies & Analysis: a comprehensive suite for transcriptome interrogation, including RNA-Seq for expression profiling, etc.



U.S. DEPARTMENT OF
ENERGY
Office of Science

12TH INTERNATIONAL CONGRESS OF HUMAN GENETICS

11-15 OCTOBER 2011 · MONTREAL CONVENTION CENTRE

WWW.ICHG2011.ORG

INVITED SPEAKERS

- Seong-Jin Kim, Gachon University of Medicine & Science (Korea)
- James Lupski, Baylor College of Medicine (USA)
- Lalji Singh, Centre for Cellular and Molecular Biology (INDIA)
- Peter Singer, University of Toronto (CANADA)
- Michael Stratton, The Wellcome Trust (UK)
- Douglas Wallace, Children's Hospital of Pennsylvania (USA)
- Emma Whitelaw, Queensland Institute (AUS)
- James Watson, Cold Spring Harbor Laboratory (USA)

INVITED SCIENTIFIC SESSIONS

Analytical Approaches

- Transgenerational effects
- Twins and epigenetics
- Nutrigenomics: Gene-Environment Interactions
- Quantitative Traits

Clinical Disorders

- Neurogenetics
- Cancer
- Mitochondrial
- OI

Ethics and Education

- Newborn screening specimens
- Ethics in large international studies
- International Education approaches

Education Sessions

- Therapy
- Prenatal diagnosis
- Developmental biology

Updates on Molecular Studies

- Lysosomal diseases
- Non-coding RNAs
- Transcriptome, proteome, and pathways
- Individual resequencing
- Genetic instability
- Chromosome architecture

DEBATES · SYMPOSIA · WORKSHOPS
ABSTRACT-DRIVEN SESSIONS
PLATFORMS · POSTERS · PLENARY
NETWORKING · TRAVEL AWARDS

12TH ICHG MONTREAL

11-15 OCTOBER 2011

AND



THE
AMERICAN
SOCIETY
OF HUMAN
GENETICS

61st Annual Meeting

NW208632E



The CEPH and the Centre National de Génotypage
in association with
the European Sequencing and Genotyping Infrastructure
are pleased to announce

The 4th Paris Workshop on Genomic Epidemiology

Dates: May 30, 31 & June 1, 2011

The Paris Workshops on Genomic Epidemiology are held every two years to introduce researchers to new methodologies that underpin large-scale genomic studies of diseases and other applications in the life sciences, particularly in the context of on-going research funded by the EU. The last two years have witnessed the emergence of powerful new sequencing methodologies with vast consequences for systems approaches in biology. The inclusion of these into epidemiological scale studies allows the rapid identification of biological markers underlying many diseases. This workshop will discuss progress in these and other technologies for biomolecular analysis, and their applications in research and clinical settings. Solutions will be presented for the accumulation, handling and interpretation of huge data sets, including the identification of rare and common genetic variants associated with disease, functional evaluation of genetic variation, understanding of gene networks and epigenomic phenomena in health and disease, pharmacogenomics, gene-gene and gene-environment interactions. Examples of the application of these technologies for epidemiological scale studies in different disease areas will be presented.

The 4th Paris Workshop inaugurates a major new EU initiative, The European Sequencing and Genotyping Infrastructure (ESGI). The ESGI groups major European genome centres into a single infrastructure designed to increase European access to the most recent genomic technologies. ESGI platforms and access modalities will be presented at the meeting.

Confirmed speakers: Gonçalo Abecasis (U. Michigan, USA), David Balding (U. College London, UK), David Bentley (Illumina, USA), Alvis Brazma (EBI, UK), Anne-Cambon Thomsen (UMR Inserm, France), Bill Cookson (Imperial College London, UK), Ivo Gut (CNAG, Spain), Margret Hoehe (MPI-MG, Germany), Richard Houlston (ICR, UK), Norbert Hübner (MDC, Germany), Maneesh Jain (Life Technologies, France), Achillefs Kapanidis (Oxford, UK), Peter Laird (U. Southern California, USA), Liang Liming (Harvard, USA), Kerstin Lindblad-Toh (Broad, USA), Yukihide Momozawa (U. Liège, Belgium), Mats Nilsson (U. Uppsala, Sweden), Shaun Purcell (MGH, USA), Mark Ratain (U. Chicago, USA), Kathryn Roeder (Carnegie Mellon, USA), Sascha Sauer (MPI-MG, Germany), Daniel Schaid (Mayo Clinic, USA), Harold Swerdlow (Sanger, UK), Ann-Christine Syvänen (U. Uppsala, Sweden), Jenny Taylor (U. Oxford, UK), Mathias Uhlen (KTH, Sweden), Hubert Vidal (Inserm/Inra, France), Hugh Watkins (U. Oxford, UK), Dan Weeks (U. Pittsburgh, USA), John Whittaker (GSK, UK), Kurt Zatloukal (Med. U. Graz, Austria).

Organisers: Ivo Gut, Mark Lathrop, Sascha Sauer and Dan Weeks

Place: Maison de la Chimie, 28 rue Saint-Dominique, 75007 Paris, France (Strictly limited to 200 participants)

Sponsors: CEPH, CNG and European Commission FP7 projects: ESGI (Infrastructure), READNA, CAGEKID (large-scale collaborative projects)

Further information and registration: <http://www.cng.fr/workshop2011>

W209387EL

COURSES AND CONFERENCES

HINXTON CAMBRIDGE UK

ADVANCED COURSES

Molecular Basis of Bacterial Infection

8–14 May 2011

Functional Genomics and Systems Biology

13–22 June 2011

Human Genome Analysis: Genetic Analysis of Multifactorial Diseases

23–29 July 2011

Drosophila Genetics and Genomics

7–22 August 2011

Molecular Approaches to Clinical Microbiology in Africa

Blantyre, Malawi
10–16 September 2011

Next Generation Sequencing

2–10 October 2011

Practical Aspects of Biopharmaceutical Drug Discovery

Autumn 2011 (dates t.b.c.)

WORKSHOPS

Working with the Human Genome Sequence

Dubai, United Arab Emirates
19–21 March 2011
Hinxton, UK
9–11 May 2011

Working with Pathogen Genomes

Montevideo, Uruguay
20–25 March 2011

SCIENTIFIC CONFERENCES

Biomarkers for Brain Disorders: Challenges and Opportunities

27 February–2 March 2011

Genomic Disorders: The Genomics of Rare Diseases

23–26 March 2011

Cellular Cytoskeletal Motor Proteins

30 March–1 April 2011

Genomic Standards

3–6 April 2011

Nicotinic Acetylcholine Receptors

18–21 May 2011

Applied Bioinformatics & Public Health Microbiology

1–3 June 2011

Mouse Colony Management

13–16 June 2011

Molecular Biology of Hearing and Deafness

6–9 July 2011

The Structure and Dynamics of Chromatin

3–4 August 2011

Wellcome Trust School on Biology of Social Cognition

14–21 August 2011

The Leena Peltonen School of Human Genomics

21–25 August 2011

The Genomics of Common Diseases

30 August–2 September 2011



Epigenomics of Common Diseases
13–16 September 2011

**Pharmacogenomics and
Personalised Medicine**
29 September–2 October 2011

**Functional Genomics & Systems
Biology 2011**
29 November–1 December 2011

Full details of Wellcome Trust Advanced
Courses and Scientific Conferences at:
www.wellcome.ac.uk/hinxton

HANDS-ON TRAINING AT EBI

**Small Molecule Bioactivity Resources
at the EBI**
14–18 February 2011

**Advanced RNA-Seq and ChIP-Seq
Data Analysis**
7–9 March 2011

**Programmatic Access to Biological
Databases (Java)**
9–13 May 2011

**FEBS: In Silico Systems Biology
for Complex Diseases: Network
Reconstruction, Analysis and
Network Based Modelling**
23–27 May 2011

COURSES AND CONFERENCES 2011

The Wellcome Trust Genome Campus at Hinxton
is home to world-class scientific training and
conference programmes, provided by The Wellcome
Trust and the European Bioinformatics Institute (EBI).

For current details of all Campus events, please visit:
www.hinxton.org

The Wellcome Trust is a charity registered in England, no. 210183.

**EBI-Wellcome Trust Summer School
in Bioinformatics**
20–24 June 2011

Proteomics Bioinformatics Workshop
15–19 July 2011

**EMBO Practical Course: Analysis and
Informatics of Transcriptomics Data**
24–29 October 2011

**EMBO Practical Course:
Computational Structural Biology -
From Data to Structure to Function**
14–18 November 2011

Full details of EBI training at:
www.ebi.ac.uk/training





2011 COLD SPRING HARBOR ASIA MEETINGS SCHEDULE



www.csh-asia.org
 Cold Spring Harbor Asia Conference
 Suzhou Dushu Lake Conference Center
 No.299 Qiyue Road
 Suzhou, Jiangsu Province, China
 Phone: +86 512 6272 9029
 Fax: +86 512 6272 9029
meetings@csh-asia.org



Cold Spring Harbor Asia conferences will be held at Suzhou Dushu Lake Conference Center in Suzhou, China, sixty miles west of Shanghai and in easy reach of international and domestic airports. Suzhou is an ancient city known as the Venice of China, famous for its canals and private gardens and home to scholars for more than two millennia. Symposia, conferences and summer schools follow the Cold Spring Harbor tradition in showcasing (most) based scientific advances in an informal but intense atmosphere.

To encourage significant international participation from throughout Asia, Europe and the Americas, the language of all programs will be English.



SPRING CONFERENCES

High Throughput Biology

April 19-23, Abstract due February 4
 Bing Ren, Eddy Rubin, Tian Xu

New Advances in Optical Imaging of Live Cells & Organisms

May 9-13, Abstract due February 25
 Atsushi Miyawaki, Sunney Xia, Xiaowei Zhuang

Membrane Proteins: Structure & Function

May 16-20, Abstract due March 4
 Carola Hunte, Chuck Sanders, Yigong Shi

Translational Approaches to Cancer

May 23-27, Abstract due March 11
 Saljuan Chen, David Huang, Yongzhang Luo, Hiroyuki Mano, Scott Powers

Plant Cell and Developmental Biology

May 31-June 4, Abstract due March 18
 Xiao-ya Chen, Hong Ma, Weicai Yang, Zhenbiao Yang

FALL CONFERENCES

Infection & Immunity

September 9-12, Abstract due June 29
 Shizuo Akira, Xuetao Cao, Genhong Cheng, Luke O'Neill

Global Health & Microbial Genomics

September 13-17, Abstract due July 1
 Matthew Bennett, Julian Parkhill

Protein Structure-Based Drug Design

September 19-23, Abstract due July 8
 Arthur Godman, Huiliang Jiang, Joel L. Sussman, Soichi Wakatsuki

Protein Homeostasis in Health & Disease

September 26-30, Abstract due July 15
 Richard Morimoto, Kazuhiko Nagata, Chih-chen Wang

Developmental Biology

October 11-15, Abstract due July 22
 Stephen Cohen, Takashi Shtrelnara, Ting Xia

Assembly, Plasticity, Dysfunction & Repair of Neural Circuits

October 17-21, Abstract due July 29
 Barry Dickson, Zhigang He, Hitoshi Okamoto, Yimin Zou

Joint CSH Asia/ISSCR Conference on Cellular Programs & Reprogramming

October 24-28, Abstract due August 19
 Hongkui Deng, Narry Kim, Ronald McKay, Toshio Suda, Richard Young

2011 Symposium:

Design & Synthesis of Biological Systems
 November 6-11, Abstract due August 24
 Daniel Gibson, Sang Yup Lee, Pamela Silver

Bioinformatics of Human and Animal Genomics

November 14-18, Abstract due September 2
 Ewan Birney, Lincoln Stein, Jun Wang, Zhiping Wang

For the most updated information, please visit our website at: www.csh-asia.org.

LANDSCAPE (Yun Shou-ping; 1633-1696) / 晴江晚景图 / ink on paper / Size: 16.1 x 32.2 cm.

Yun Shou-ping was a native of Wu-shi, Kangsu. He was originally named Ke. His style names were Shou-ping, which became his more commonly known name, and Chang-shu. His surnames were Yan-jie, Tung-suei (to 4), Tung-yuan (to 2), and Pa-yeh (to 4th). Since he was an old pattern family, he did not wear the new Ch'ing regime. His poetry and writing were transcendental in quality. He was the head of the Six Sects of P'i-ting. Initially he was a landscape painter who strove to revive the ancient, traditional style. After seeing the works of Wang Hui of Yu-shan and Wang Meng's colorful style in ink and wash, he thereafter pursued competition in flower painting. In all the painting he followed the Northern Sung painter Hsu Ch'ung-suei. His compositions revived with a scholar's style. He especially loved his landscape painting kept him from aspiring to be an official or a politician; however, his works deeply reflected the tranquil and subtle qualities of the Yuanist were also sought after as models. Yun Shou-ping's ink washes possessed a beautiful flavor. His calligraphy was elegant and had a style of his own. His painting, poetry and calligraphy were called "Three Treasures of the scholar."



The Great Meadow | 2010 | Renee Lammers | www.ReneeLammers.com

2011 Courses, Workshops and Meetings (subject to change)

- | | |
|-------------------|---|
| March 7 – 9 | Workshop on Colony Management: Principles and Practices — inStem, Bangalore, India |
| March 8 – 11 | Workshop on Surgical Techniques in the Laboratory Mouse — Scripps Research Institute, La Jolla |
| April 3 – 8 | Workshop on Surgical Techniques in the Laboratory Mouse |
| April 17 – 22 | Workshop on Comprehensive Approaches to the <i>in vivo</i> Assessment of Cardiovascular Function in Mice |
| May 8 – 12 | Workshop on Colony Management: Principles and Practices |
| June 9 – 10 | Mammary Stem Cell Training Course |
| June 14 – 17 | Workshop on Embryo Transfer |
| June 20 – 24 | Workshop on Cryopreservation of Mouse Germplasm |
| July 17 – 29 | 52nd Annual Short Course on Medical and Experimental Mammalian Genetics |
| August 14 – 18 | Short Course on the Genetics of Addiction |
| August 19 – 27 | 20th Annual Short Course on Experimental Models of Human Cancer |
| September 8 – 16 | Genomic and Proteomic Approaches to Complex Heart, Lung, Blood & Sleep Disorders |
| September 18 – 23 | Workshop on Phenotyping Mouse Models of Human Lung Disease |
| September 23 – 29 | 10th Annual Workshop on the Pathology of Mouse Models for Human Disease — Purdue University, Indianapolis |
| October 2 – 9 | Short Course on Systems Genetics |
| October 9 – 11 | Coming Together on Epilepsy Genetics: From Human to Model Organisms and Back |
| October 16 – 20 | Workshop on Techniques in Modeling Human Colon Cancer in Rodents |
| October 23 – 28 | Workshop on Surgical Techniques in the Laboratory Mouse |
| December 6 – 9 | Workshop on Surgical Techniques in the Laboratory Mouse — Scripps Research Institute, La Jolla |

*All events are held at The Jackson Laboratory in Bar Harbor, Maine unless specified otherwise.
Dates are subject to change. Details and updates are available on line: courses.jax.org/event-listings*



1st HEALING International Meeting
Hh-Gli Signalling in Development,
Regeneration and Cancer
 Kolymbari, Crete, June 23-25 2011



Registration deadline: 1 March 2011

Hedgehog signalling and development: Marco Milán (Institute for Research in Biomedicine, Barcelona), Suzanne Eaton (Max Planck, Dresden), Matt Scott (Stanford U, Palo Alto), Nadia Dahmane (The Wistar Institute, Philadelphia), Pascal Théron (U Nice), Tom Kornberg (UC San Francisco), Isabel Guerrero (U. Autónoma Madrid), Christos Delidakis (FORTH, Heraklion). **HH-GLI and stem cells:** Valérie Wallace (U. Ottawa), Phil Ingham (IMCB, Singapore), Patrick Mehlen (U. Lyon), Barbara Stecca (I Tumori Toscani, Florence), Bill Matsui (Johns Hopkins, Baltimore), Alberto Gulino (La Sapienza, Rome). **HH-GLI and regeneration:** Alejandro Sánchez Alvarado (U. Utah, Salt Lake City), Deborah Gumucio (U. Michigan, Ann Arbor), Wei Chen (Johns Hopkins, Baltimore), Jens Mueller (Analyticon, Potsdam), Rune Toftgård (Karolinska I., Stockholm). **HH-GLI in cancer and cancer stem cells:** Martine Roussel (St. Jude, Memphis), Joan Seoane (H. Vall d'Hebron, Barcelona), Julien Sage (Stanford U, Palo Alto), David Robbins (U. Florida, Miami), Kelly Bennet (BMS, Princeton), Fritz Aberger (PLUS, Salzburg), Ariel Ruiz i Altaba (U. Geneva)

<http://www.fp7-healing.eu/internationalmeeting>

1st HEALING Summer School Kolymbari, Crete, June 20-22 2011
 Alejandro Sánchez Alvarado (Salt Lake City, USA): Stem cells and regeneration, Phil Ingham (Singapore): Muscle lineages and fate choices, Suzanne Eaton (Dresden, Germany): Lipid metabolism and Hh signalling, Nadia Dahmane (Philadelphia, USA): Cerebellar development and cancer, Tom Kornberg (San Francisco, USA): Morphogens, cytonemes and pattern formation, Valérie Wallace (Ottawa, Canada): Stem cells in eye therapies, Isabel Guerrero (Madrid, Spain): Gradient formation, patterning and regeneration, Alberto Gulino (Rome, Italy): Oncogenic pathways in development and stem cells, Rune Toftgård (Stockholm, Sweden): Skin regeneration, stem cell activation and cancer development. Christos Delidakis (Heraklion, Greece): co-organizer, Ariel Ruiz i Altaba (Geneva, Switzerland): co-organizer



<http://www.fp7-healing.eu/summerschool>

W209248E

HUPO 2011
 10th WORLD CONGRESS
 4-7 SEPTEMBER 2011
 Geneva
WWW.HUPO2011.COM

Save the Date

CONGRESS CO-CHAIRS
Jean-Charles Sanchez
 Department of Human Protein Sciences
 Geneva University, Switzerland

Denis Hochstrasser
 Department of Genetics and
 Laboratory Medicine & Department
 of Human Protein Sciences Geneva
 University & University Hospitals,
 Switzerland

Luca Bini
 Department of Molecular Biology,
 Siena University, Italy

**Chairmen of HUPO Education Day,
 HUPO Clinical Day, Eupa Day,
 HUPO & EuPA Awards and
 HUPO & EUPA Initiatives**

- Clinical Day Chairs:
Pierre Burkhard & Daniel Chan
- Education Day Chairs:
Thierry Rabilloud & Peter James
- EUPA Day Chairs:
Jesus Jorin & Jean-Jacques Diaz
- HUPO & EuPA Awards Chairs:
Concha Gil & Maxey Chung
- HUPO & EUPA Initiatives Chairs:
Juan-Pablo Albar & Gil Omenn

SCIENTIFIC SESSIONS

1. Infectious Diseases
2. Organellar Proteomics
3. MS Quantitation
4. Oncology
5. Post-Translational Modifications
6. Protein Arrays
7. Central Nervous System
8. Membrane Proteins
9. Data and Knowledge
10. Metabolic Disorders
11. Functional Proteomics
12. Biomarker Discovery
13. Cardiovascular and Atherosclerosis
14. Pharmacology-toxicology
15. Imaging

IMPORTANT DATES AND DEADLINES

Online registration open:
1 January 2011

Abstract submission open:
1 December, 2010

Abstract submission closing:
16 March, 2011

Notification of acceptance/rejection of
abstracts:
15 May, 2011

Late Breaking Abstracts:
15 May 2011

Early bird registration:
16 May 2011

Accommodation reservation:
30 June, 2011

HUPO 2011:
4 - 7 September, 2011

W209445E



*Plan to attend Europe's leading
 Human Genetics Meeting:*

European Human Genetics Conference

May 28 - 31, 2011
 Amsterdam RAI, The Netherlands

*Programme and
 registration details on*

www.eshg.org/eshg2011

W209397E

SYMPOSIUM - EXHIBITION - WORKSHOPS
DEVELOPMENTS IN REAL-TIME PCR
From Preanalytics to Molecular Diagnostics
June 2011 Prague, Czech Republic

Symposium Highlights 14th-15th

- Preanalytics - Sample preparation
- Standardization and quality control
- Experimental design and data analysis
- Molecular diagnostics - special focus on circulating tumor cells (CTCs)
- High throughput expression profiling
- Single cell expression and profiling
- MicroRNAs and non-coding RNAs

Workshops 13th, 16th-17th

- Introduction to real-time qPCR
- Hands-on qPCR
- Experimental design and statistical data analysis for qPCR
- Sample preparation & quality control
- Invited speakers course - Come and meet the experts in the field!

Key speakers
 Russel Higuchi, Klaus Pantel,
 Uwe Oelmüller, Mikael Kubista et al.

www.qpcrsymposium.eu

W209212E

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Meetings

Systems Biology: Networks

March 22 - 26

Computational Cell Biology

March 29 - April 1

Stem Cell Engineering & Cell-Based Therapies

April 7 - 10

Synapses: From Molecules to Circuits & Behavior

April 12 - 16

The Biology of Cancer: Microenvironment, Metastasis & Therapeutics

April 26 - 30

Telomeres & Telomerase

May 3 - 7

Honey Bee Genomics & Biology Workshop

May 8 - 10

The Biology of Genomes

May 10 - 14

The Ubiquitin Family

May 17 - 21

Retroviruses

May 23 - 28

76th Symposium: Metabolism & Disease

June 1 - 6

Single Cell Analysis

July 22 - 24

Yeast Cell Biology

August 16 - 20

Eukaryotic mRNA Processing

August 23 - 27

Mechanisms of Eukaryotic Transcription

August 30 - September 3

Eukaryotic DNA Replication & Genome Maintenance

September 6 - 10

Microbial Pathogenesis & Host Response

September 13 - 17

Stem Cell Biology

September 20 - 24

Personal Genomes

September 30 - October 2

Neurobiology of *Drosophila*

October 3 - 7

Cell Death

October 11 - 15

Genome Informatics

November 2 - 5

Harnessing Immunity to Prevent & Treat Disease

November 16 - 19

Plant Genomes & Biotechnology: From Genes to Networks

November 30 - December 3

RNA & Oligonucleotide Therapeutics

December 4 - 7

Rat Genomics & Models

December 7 - 10

Courses

Protein Purification & Characterization

April 6 - 19

Cell & Developmental Biology of *Xenopus*

April 8 - 19

Workshop on Autism Spectrum Disorders

June 8 - 15

Advanced Bacterial Genetics

June 8 - 28

Ion Channel Physiology

June 8 - 28

Molecular Embryology of the Mouse

June 8 - 28

Proteomics

June 13 - 28

Workshop on Pancreatic Cancer

June 16 - 22

Molecular Neurology & Neuropathology

June 27 - July 3

Computational Cell Biology

July 1 - 21

Frontiers & Techniques in Plant Science

July 1 - 21

Neurobiology of *Drosophila*

July 1 - 21

Structure Function & Development of the Visual System

July 6 - 19

Advanced Techniques in Molecular Neuroscience

July 6 - 21

Biology of Memory

July 21 - August 3

Eukaryotic Gene Expression

July 26 - August 15

Imaging Structure & Function in the Nervous System

July 26 - August 15

Yeast Genetics & Genomics

July 26 - August 15

Integrated Statistical Analysis for Genome Scale Data

August 2 - 15

Cellular Biology of Addiction

August 9 - 15

Live Cell Imaging, Super-Resolution

Imaging and Image Analysis

October 19 - November 1

Programming for Biology

October 17 - November 1

X-Ray Methods in Structural Biology

October 17 - November 1

Circuits & Connectivity in the Vertebrate Brain

October 19 - November 1

Advanced Sequencing Technologies & Applications

November 8 - 21

C. elegans

November 8 - 21

Computational & Comparative Genomics

November 9 - 15

The Genome Access Course

April 19 - 20, November 29 - 30



Photo above: Cocktails during the 2010 Symposium at the unveiling of the Darwin statue.

Cold Spring Harbor Laboratory Please visit our web site for the latest updates and additions.

Meetings & Courses Program, 1 Bungtown Road, Cold Spring Harbor, NY 11724

Phone 516 367 8346 email meetings@cshl.edu www.cshl.edu/meetings